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A new species of *Phallus* from Pakistan

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Abstract — *Phallus calongei*, a new species of *Phallales* from Pakistan, is described. This new species is characterized by a white, weakly developed volva, large fusiform white to pale pinkish pseudostipe, a strongly reticulate receptacle surface with pinkish ridges, and absent indusium. Color photo and black-and-white line illustrations are provided.

Key words — *Basidiomycota, Phallaceae,* taxonomy

Introduction

The genus *Phallus* Junius ex L., typified by *P. impudicus* L., is classified in family *Phallaceae* Corda, order *Phallales* E. Fisch. (Kirk et al. 2008). Calonge (1998) characterizes this genus by the following features: "Basidioma ovoid before ripening, white, soft, with mycelial cords. Exoperidium membranous. Endoperidium gelatinous, hyaline. The rest of the peridium remains at the base like a volva. Mature pseudostipe cylindrical, hollow, white, spongy and fragile, carrying at the apex a conical receptacle, sometimes with indusium. Gleba covering the receptacle, mucilaginous, foetid, olive brown. Spores ellipsoid, pale yellowish green, smooth."

Phallus species are widespread, with basidiomata growing in rich humus soils (humid woods, gardens), littoral dunes, and fallen decaying wood. Several authors have presented comprehensive treatments of this genus. Lloyd (1909) published a synopsis of the known phalloids. Liu (1984), who included the genus *Dictyophora* Desv., recognized 15 taxa (13 species and 2 varieties) for China. Kreisel (1996) recognized 31 species of *Phallus* sensu lato (incorporating *Dictyophora*, *Aporophallus* Möller, *Itajahya* Möller, *Echinophallus* Henn., *Endophallus* M. Zang & R.H. Petersen, and several other genera). Finally, Calonge (2005) accepted 25 species and provided a provisional key.

Additional species described during the last six years include *Phallus minusculus* Kreisel & Calonge from Tanzania (Calonge & Kreisel 2002), *Phallus pygmaeus* Baseia from Brazil (Baseia et al. 2003), *Phallus atrovolvatus* Kreisel & Calonge from Costa Rica (Calonge et al. 2005), *Phallus tenuissimus* T.H. Li et al. from China (Li et al. 2005), and *Phallus maderensis* Calonge from Madeira Island, Portugal (Calonge et al. 2008).

From Pakistan, only three *Phallus* species — *P. celebicus* Henn., *P. impudicus, P. rubicundus* (Bosc) Fr. — have previously been reported (Ahmad 1952). With the addition of the new species proposed below, the number of *Phallus* species from Pakistan increases to four.

Materials and methods

The examined specimens come from the herbaria NY and STR. Specimens were mounted in Hoyer's medium and studied with a Nikon microscope. Spore measurements were made under the oil immersion objective.

Taxonomic description

Phallus calongei G. Moreno & Khalid, **sp. nov.** Figs. 1–3

MycoBank MB 512772; Genbank FJ785522

Ovum 25 mm diametrum, album. Basidioma maturus cum pseudostipite fusiforme, roseolo, pallido, usque ad 24 cm alto, album, spongioso. Receptaculo trunco-conico cum apice perforato, 7 cm alto et 4 cm lato, reticulato, rosado. Gleba brunneo-olivacea, foetida. Indusium nullo. Volva alba. Sporae cylindraceae, 3.5–4.5 × 1.5–2.0 µm, ellipsoidea, hyalinae. Non gregarius ad terram.

Type: Pakistan, North Western Frontier Province (NWFP), on ground, on way to Khanspur stream, at 2575 m a.s.l., 16th June, 2008, ANK # 169063. (**Holotype:** LAH Herbarium No. ANK 1005). **Isotype:** AH 37768.

Etymology: *calongei*, dedicated to Prof. F.D. Calonge to honor his contribution to the study of gasteroid fungi.

Unexpanded fruitbody (egg stage) ovate, white. Basidioma up to 24 cm high (Fig. 1). Exoperidium membranous, endoperidium gelatinous, hyaline. At maturity a fusiform pseudostipe develops up to 3 cm in diam., whitish, hollow, wall consisting of layers of chambers, perforated (Fig. 2). Receptacle up to 7 cm high and 4 cm in diam., campanulate to conical-truncate with a reticulate surface, as the gleba dissipates, the receptacle surface becomes strongly reticulated, with raised pinkish ridges; apex truncated, formed by a plane, depressed and

Figs. 1–2. *Phallus calongei* (holotype). 1. Basidioma with olivaceous dark gleba, white and fusiform pseudostipe, membranous volva. 2. Reticulated receptacle, pink, with an olivaceous green spore mass. Scale bar = 1 cm.

1
2

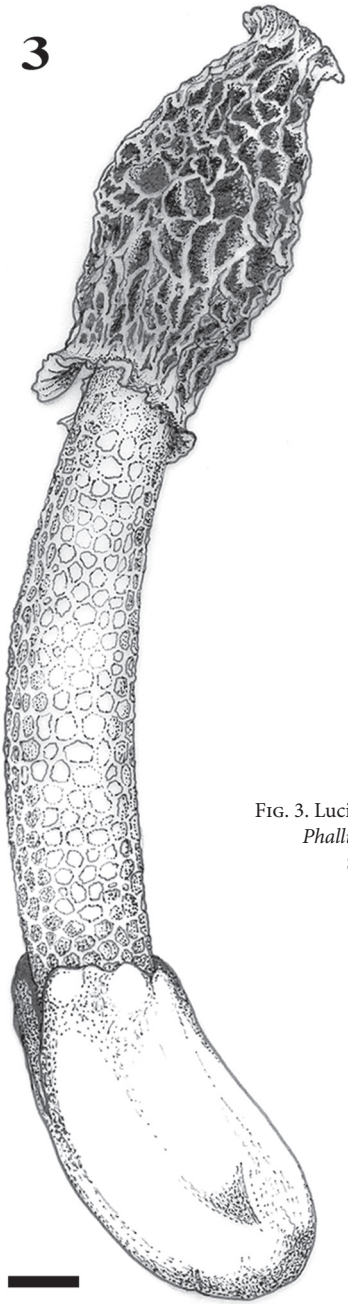

Fig. 3. Lucida drawing of basidioma of *Phallus calongei* (holotype). Scale bar = 1 cm.

perforated surface (Fig. 3). Gleba olivaceous, foetid, deliquescent. Spores 3.5–4.5 × 1.5–2.0 µm, ellipsoid, smooth, hyaline. Indusium absent. Volva consisting of a thin membrane, scarcely developed, non-perforated, white.

Discussion and conclusions

According to Kreisel (1996; pers. com. 2009), these specimens belong to the subgenus *Phallus,* section *Flavophallus* Kreisel, with six other species: *P. flavocostatus* Kreisel, *P. tenuis* (E. Fisch.) Kuntze, *P. formosanus* Kobayasi, *P. callichrous* (Möller) Lloyd, *P. multicolor* (Berk. & Broome) Cooke, and *P. cinnabarinus* (W.S. Lee) Kreisel. The proposed new species, *Phallus calongei,* is easily differentiated from the others by its scarcely developed white volva, large fusiform pure white to pale pinkish pseudostipe, a strongly reticulate receptacle surface with pinkish ridges, and absent indusium.

Only one other *Phallus* species, *P. rubicundus*, has a reddish receptacle surface and its receptacle is conical with a rugose surface. Other described species lacking an indusium and with pinkish tones include *P. formosanus*, with a pale pinkish pseudostipe and volva; *P. macrosporus* B. Liu et al., with a reddish volva, and *P. hadriani* Vent., with a purple volva.

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